CLAIMS:

1. A liquid supply system comprising: a liquid reservoir; a liquid container for supplying liquid to the reservoir; connection means connecting the reservoir to a position within the container that is immersed in the contained liquid; and means for alternately pressurising and depressurising the reservoir, the arrangement being such that when the reservoir is pressurised gas is forced into the container through the connection means and accumulates above the liquid in the container, and such that when the reservoir is depressurised accumulated gas in the container forces liquid through the connection means to the reservoir.

2. A system in accordance with claim 1, arranged such that gravity urges contained liquid to flow from the container to the reservoir, the connection means comprising inhibiting means arranged to inhibit gravity feed of the reservoir with liquid from the container.

3. A system in accordance with any preceding claim, wherein the connection means comprises a conduit.

4. A system in accordance with claim 3, wherein the conduit is arranged to extend to the reservoir from said immersed position.

5. A system in accordance with any preceding claim, wherein the connection means comprises valve means.

6. A system in accordance with any preceding claim, wherein the connection means comprises a tube having a bore dimensioned such that surface tension of the liquid inhibits flow of the liquid through the bore.

7. A system in accordance with any preceding claim, wherein the container is substantially rigid and contains a volume of gas above the contained liquid, whereby pressurisation of the reservoir increases the gas pressure in the container.

8. A system in accordance with any preceding claim, wherein the container comprises resealable valve means adapted to reseal the container when it is disconnected from the reservoir.

9. An system in accordance with claim 8, wherein the resealable valve means comprises a membrane, and the connection means comprises a needle adapted to pierce the membrane to connect the liquid inside the container to the reservoir.

10. A system in accordance with claim 8, wherein the resealable valve means comprises a valve member and biasing means biasing the member towards a valve seat.

11. A system in accordance with any preceding claim, further comprising attachment means arranged to rigidly and releasably attach the container to a housing of the reservoir.

12. A system in accordance with claim 11, wherein the attachment means comprises a threaded neck on the container and a correspondingly threaded socket provided on the reservoir housing.

13. A system in accordance with any preceding claim, further comprising a filter arranged inside the reservoir.

14. A system in accordance with claim 13, wherein the means for pressurising and depressurising is arranged to pressurise and depressurise a volume inside the reservoir and above the filter.

15. A system in accordance with any preceding claim, wherein the means for pressurising and depressurising comprises a compressed gas supply, a compressed gas conduit connecting the compressed gas supply to a compressed gas inlet of the reservoir, and control means arranged to control supply of the compressed gas from the supply into the reservoir.

16. A system in accordance with claim 15, wherein the control means is adapted to supply pressure pulses to the reservoir.

17. A system in accordance with claim 16, wherein the pressure pulses are arranged to have relatively rapidly rising leading edges and relatively slowly falling trailing edges.

18. A system in accordance with any one of claims 15 to 17, wherein the control means comprises a controllable valve.

19. A system in accordance with claim 18, wherein the control means further comprises a passive valve arranged downstream of the controllable valve, the passive valve being adapted to initially allow gas flow towards the reservoir when an inlet of the passive valve is exposed to pressurised gas from the supply as a result of the controllable valve being opened, and then to close automatically after a period of time in response to continued exposure, to prevent further flow, and to remain closed until the pressure at the inlet to the passive valve drops below a predetermined threshold, whereby pressurised gas is supplied to the reservoir via the controlled and passive valves.

20. A system in accordance with claim 19, wherein the passive valve comprises a valve member biased towards a first position in which gas flow through the

passive valve is permitted, the valve member being deflectable when exposed to the pressurised gas from the supply, as a result of the initial pressurised gas flow, to a second position in which it engages a valve seat and prevents further gas flow, continued exposure to the supply maintaining the valve member against the seat, the time taken to deflect the valve member from the first to the second position determining said period of time, and hence the length of a pressure pulse transmitted by the passive valve.

21. A system in accordance with claim 20, wherein the valve member comprises a ball, biased under gravity to sit in a first position in a valve chamber, the passive valve inlet being arranged to direct supplied pressurised gas up into the chamber, initially to flow past the ball, the ball being arranged so as to be lifted by the gas flow to a second position in which it is brought into sealing engagement with a valve seat and closes the passive valve.

22. A system in accordance with any one of claims 19 to 21, comprising at least one device having a compressed gas inlet connected so as to be supplied with compressed gas extracted from the compressed gas conduit at a position downstream of the controllable valve and upstream of the passive valve.

23. A system in accordance with claim 22, wherein the at least one device comprises a pump.

24. A system in accordance with claim 23, wherein the pump is a diaphragm pump.

25. A system in accordance with any one of claims 22 to 24, wherein the at least one device comprises an air knife or air curtain generator.

26. A system in accordance with any preceding claim, wherein the means for pressurising and depressurising comprises a gas exhaust conduit connecting a gas outlet of the reservoir to atmosphere, the gas exhaust conduit comprising

restriction means arranged to restrict flow of gas from the reservoir to atmosphere.

27. A system in accordance with claim 26, wherein the restriction means is adjustable.

28. A system in accordance with either one of claims 26 and 27, as depending from claim 15, wherein the gas outlet of the reservoir is provided by the gas inlet, and the gas exhaust conduit comprises a portion of the compressed gas conduit and a branch off the compressed gas conduit, the restriction means being located on said branch.

29. A system in accordance with claim 28, as depending from claim 19, wherein said branch branches from the compressed gas conduit at a position downstream of the passive valve.

30. A system in accordance with any preceding claim and for an inkjet printer, the liquid container containing a quantity of ink, and the reservoir being an ink reservoir adapted to supply ink to a print head.

31. A system in accordance with claim 30, wherein the liquid container is an ink refill container.

32. A system in accordance with claim 30 or claim 31, arranged such that when the reservoir is pressurised to force gas into the container, pressure is applied to a surface of ink in the reservoir to force ink to the print head.

33. An inkjet printer comprising: a print head having at least one orifice from which a jet of ink can be ejected; and a liquid supply system in accordance with any preceding claim, the liquid container being an ink container, and the reservoir being an ink reservoir arranged to supply ink to the print head.

34. An inkjet printer in accordance with claim 33, the liquid supply system being arranged such that when the reservoir is pressurised to force gas into the container, pressure is applied to ink in the reservoir to force ink to the print head and purge the at least one orifice.

35. An inkjet printer in accordance with claim 33 or claim 34, wherein the means for pressurising and depressurising is arranged to supply pressure pulses to the reservoir, the pressure pulses being arranged to simultaneously force gas into the ink container and force ink to the print head to purge the at least one orifice.

36. An inkjet printer in accordance with any one of claims 33 to 35, as depending from claim 23 or claim 24, wherein the pump comprises a pump arranged to pump ink.

37. An inkjet printer in accordance with any one of claims 33 to 36, as depending from claim 25, wherein the air knife or air curtain generator is arranged to direct a curtain of gas across a surface of the print head, over the at least one orifice.

38. An ink container for use with an inkjet printer in accordance with any one of claims 33 to 37, the container being sealed and containing a quantity of ink and a volume of gas, the gas being at a pressure, when the container is sealed, less than atmospheric pressure.

39. A method of supplying liquid to a liquid reservoir from a liquid container, the method comprising the steps of: connecting the reservoir to a position within the container that is immersed in the contained liquid; and alternately pressurising and depressurising the reservoir, such that when the reservoir is pressurised gas is forced into the container through the connection and accumulates above the liquid in the container, and such that when the reservoir

is depressurised accumulated gas in the container forces liquid through the connection means to the reservoir.

40. A method in accordance with claim 39, wherein the step of alternately pressurising and depressurising the reservoir comprises applying a series of pressure pulses to the reservoir.

41. A method in accordance with claim 40, wherein the liquid container is an ink container, the reservoir is an ink reservoir arranged to supply ink to the print head of an inkjet printer, the method further comprising the step of using the series of pressure pulses to purge ink through the printhead.

42. A method in accordance with any one of claims 39 to 41, wherein the step of alternately pressurising and depressurising the reservoir comprises the steps of generating a first pressure pulse having a first length, generating from the first pulse a second pressure pulse having a second, shorter length, and applying the second pressure pulse to a volume inside the reservoir.

43. A method in accordance with claim 42, wherein the step of generating the first pressure pulse comprises supplying compressed gas to the inlet of a controllable valve, opening the valve, and then after a period of time closing the valve.

44. A method in accordance with claim 42 or claim 43, wherein the step of generating the second pulse comprises supplying the first pulse to the inlet of a valve adapted to close automatically after a period of exposure to the first pulse, and to remain closed for the remaining duration of the first pulse.

45. A method in accordance with any one of claims 42 to 44, further comprising the step of supplying the first pulse to operate an auxiliary device.

46. A method in accordance with any one of claims 39 to 45, wherein the step of pressurising the reservoir comprises supplying pressurised gas to a volume inside the reservoir.

47. A method in accordance with any one of claims 39 to 46, wherein the step of depressurising the reservoir comprises reducing gas pressure in a volume inside the reservoir by venting the volume to atmosphere via a restrictor.

48. An inkjet printer comprising:
a printhead comprising at least one orifice from which, in use, an inkjet may be ejected;
an ink reservoir connected to supply ink to the printhead; and
means for applying a first pressure pulse to ink within the reservoir to cause ink to be discharged from said at least one orifice, the means for applying a first pressure pulse comprising a supply of compressed gas connected to the inlet of a controllable valve, and control means arranged to open and close said valve, the means for applying a first pressure pulse further comprising a second, passive valve, having an inlet connected to the outlet of the controllable valve, the second valve being adapted to initially allow gas flow towards the reservoir when the second valve inlet is exposed to pressurised gas from the supply as a result of the controllable valve being opened, and then to close automatically after a period of time in response to continued exposure, to prevent further flow, and to remain closed until the pressure at the inlet to the passive valve drops below a predetermined threshold, the outlet of the second valve being connected to the reservoir to apply said first pressure pulse to the ink.

49. An inkjet printer in accordance with claim 48, wherein the passive valve comprises a valve member biased towards a first position in which gas flow through the passive valve is permitted, the valve member being deflectable when exposed to the pressurised gas from the supply, as a result of the initial pressurised gas flow, to a second position in which it engages a valve seat and

prevents further gas flow, continued exposure to the supply maintaining the valve member against the seat, the time taken to deflect the valve member from the first to the second position determining said period of time, and hence the length of a pressure pulse transmitted by the passive valve.

50. An inkjet printer in accordance with claim 49, wherein the valve member comprises a ball, biased under gravity to sit in a first position in a valve chamber, the passive valve inlet being arranged to direct supplied pressurised gas up into the chamber, initially to flow past the ball, the ball being arranged to be lifted by the flow to a second position in which it is brought into sealing engagement with a valve seat and closes the passive valve.

51. An inkjet printer in accordance with any one of claims 48 to 50, and further comprising a gas exhaust conduit connecting a gas outlet of the reservoir to atmosphere, the gas exhaust conduit comprising restriction means arranged to restrict flow of gas from the reservoir to atmosphere, the restriction enabling gas to bleed out of the reservoir after gas has been supplied to the reservoir at pressure via the first and second valves, so reducing gas pressure in the reservoir and determining the shape of the trailing edge of the first pressure pulse.

52. An inkjet printer in accordance with claim 51, wherein the restriction means is adjustable.

53. An inkjet printer in accordance with any one of claims 48 to 52, further comprising a pneumatic pump having a compressed gas inlet connected so as to be supplied from a position between the outlet of the controllable valve and the inlet of the passive valve, such that control of the controllable valve also controls the supply of compressed gas to the pump and hence operation of the pump, the pump being arranged to pump ink.

54. An inkjet printer in accordance with claim 53, wherein the pneumatic pump is a diaphragm pump.

55. An inkjet printer in accordance with any one of claims 48 to 54, further comprising gas curtain generating means arranged to direct a curtain of gas across a surface of the print head and the at least one orifice, the gas curtain generating means having a compressed gas inlet connected so as to be supplied from a position between the outlet of the controllable valve and the inlet of the passive valve, such that control of the controllable valve also controls the supply of compressed gas to the gas curtain generating means.

56. An inkjet printer in accordance with claim 55, wherein the control means is adapted to open said controllable valve and then close said controllable valve after a second period of time, such that said first pressure pulse is applied to the ink while a second pressure pulse is applied to the compressed gas inlet of the gas curtain generating means, whereby the first pressure pulse is synchronised to the curtain of gas.

57. An inkjet printer in accordance with claim 56, wherein the first pressure pulse has a shorter duration than the second pressure pulse.

58. An inkjet printer comprising:
a printhead comprising at least one orifice from which, in use, an inkjet may be ejected;
an ink reservoir arranged to supply ink to the printhead;
gas curtain generating means arranged to direct a curtain of gas across a surface of the print head and the at least one orifice;
an ink pump;
a compressed gas supply;
a controllable valve, having an inlet connected to the compressed gas supply and an outlet connected to the gas curtain generating means; and

control means arranged to control operation of the valve to control supply of compressed gas to generate the air curtain,

wherein the pump is a pneumatic pump, having a compressed gas inlet connected to the outlet of the controllable valve, and the control means is arranged to operate the controllable valve to generate pressure pulses to simultaneously operate the pump and generate the air curtain.

59. An inkjet printer in accordance with claim 58, wherein the pneumatic pump is a diaphragm pump.

60. An ink supply system for an inkjet printer, comprising: an ink reservoir adapted to supply ink to a print head; an ink container, for supplying ink to the reservoir, and containing a quantity of ink; connection means connecting the ink reservoir to a position within the ink container that is immersed in the contained ink; and means for alternately creating a pressure difference between the reservoir and the container in a first direction, such that ink flows from the container, through the connection means, and into the reservoir, and creating a pressure difference between the reservoir and the container in a second, opposite direction such that gas flows from the reservoir, through the connection means, and into the container and accumulates above the contained ink.

61. An ink supply system in accordance with claim 60, wherein the container is deformable and the means for alternately creating the pressure differences comprises means for alternately deforming and reforming the container.

62. An ink supply system in accordance with claim 60, wherein the container is rigid and contains a quantity of gas above the contained ink.

63. An ink supply system in accordance with any one of claims 60 to 62, wherein said pressure differences are between gas in the reservoir and gas contained in the container, above the contained ink.

64. An ink supply system in accordance with any one of claims 60 to 63, wherein the means for alternately creating the pressure differences comprises means for alternately pressurising and depressurising the reservoir, the arrangement being such that when the reservoir is pressurised gas is forced into the container through the connection means and accumulates above the liquid in the container, and such that when the reservoir is depressurised accumulated gas in the container forces liquid through the connection means to the reservoir.

65. An ink supply system for an inkjet printer, comprising a main body member and at least one auxiliary body member mounted on the main body member to form an assembly such that an ink reservoir cavity and a pump cavity are defined within the assembly, the pump cavity enclosing a displaceable element which divides the pump cavity into first and second chambers, the first chamber being in communication with the ink reservoir cavity and a pressurised gas inlet via a first conduit, and the second chamber being in communication with an ink inlet via a second conduit which includes a one-way valve that prevents flow of ink from the second chamber to the ink inlet, and the second chamber being in communication with the ink reservoir cavity via a third conduit which includes a second one-way valve that prevents flow of ink from the ink reservoir cavity to the second chamber, the displaceable element being arranged such that pressurisation of the first conduit to pressurise the ink reservoir cavity displaces the element to pump ink from the second chamber to the ink reservoir cavity.

66. An ink supply system in accordance with claim 65, wherein the main body member comprises a block, and the auxiliary body member comprises a head, mounted on top of the block.

67. An ink supply system in accordance with claim 65 or claim 66, wherein the displaceable element comprises a diaphragm.

68. An ink supply system in accordance with claim 67, wherein the diaphragm is sandwiched between the main body member and the auxiliary body member.

69. An ink supply system in accordance with claim 67, wherein the second chamber is provided by a cavity in the main body member and the first chamber is provided by a cavity in the auxiliary body member.

70. An ink supply system in accordance with claim 68 or claim 69, wherein the diaphragm comprises part of a sheet of material sandwiched between the main and auxiliary body members.

71. An ink supply system in accordance with any one of claims 65 to 70, wherein the first conduit further comprises a valve having a valve chamber, said valve chamber being defined inside the assembly.

72. An ink supply system in accordance with claim 71, wherein said valve chamber is provided by a cavity in the main body member.

73. An ink supply system in accordance with any one of claims 65 to 72, wherein the first conduit comprises a passageway within the assembly.

74. An ink supply system in accordance with any one of claims 65 to 73, wherein the first conduit comprises a conduit external to the assembly.

75. An ink supply system in accordance with any one of claims 65 to 74, wherein the second and third conduits comprise passageways inside the assembly.